TITLE OF THE INVENTION

MURD PROTEIN AND GENE OF *PSEUDOMONAS AERUGINOSA*

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional Application 60/087,308, filed May 29, 1998, now abandoned, and is a 371 of PCT Application US99/11585, filed May 26, 1999.

FIELD OF THE INVENTION

This invention relates to the genes and enzymes involved in cell wall synthesis in bacteria, and particularly to the inhibition of such enzymes.

BACKGROUND OF THE INVENTION

The molecular target of many naturally-occurring antibiotics, including fosfomycin, cycloserine and β-lactams, is the synthesis of the bacterial cell wall. The frequency with which these types of antibiotics arose in evolution indicates that the pathway of cell wall biosynthesis is a particularly effective point of attack against bacteria. Genetic studies confirm the soundness of this process as a target, as temperature-sensitive alleles of the intracellular pathway genes are lytic, and therefore lethal. Since the building blocks of the cell wall are highly conserved structures in both Gram-positive and Gram-negative bacteria, but are unique to the eubacteria, novel inhibitors of cell wall formation are expected to be both broad spectrum and safe antibiotics.

The bacterial cell wall is a polymer, a single molecule composed of peptidoglycan that defines the boundary and shape of the cell. Assembled by crosslinking glycan chains with short peptide bridges (Rogers, H. J., H. R. Perkins, and J. B. Ward, 1980, Biosynthesis of peptidoglycan. p. 239-297. In Microbial cell walls and membranes. Chapman & Hall Ltd. London), the completed structure is strong enough to maintain cell integrity against an osmotic pressure differential of over four atmospheres, but also flexible enough to allow the cell to move, grow and divide.